N.C. Department of Labor
Division of Occupational Safety and Health
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Raleigh, North Carolina 27699-1101

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Commissioner of Labor

HAZARD ALERT

Multi-Piece Rims

Lethal Hazards Part of Rim Repair Work

Accident Summary

Site: Accident took place at a truck dealership that bought, sold and traded medium- to heavy-duty commercial trucks. The dealership also serviced commercial trucks and buses but did not work on multi-piece rim wheels.

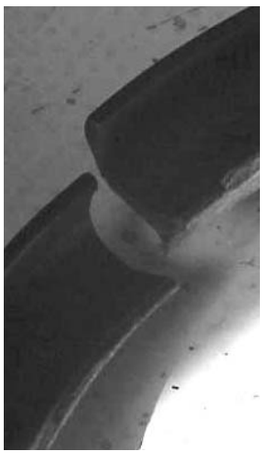
Accident Findings: A body shop technician was fatally injured by the split side ring of a multi-piece tire rim that suddenly released. The victim had been rotating the two front tires on a 1995 bus brought in for front end alignment. Both wheels were mounted on a five-spoke hub. The front right wheel had been removed and set aside, and the employee was taking off the front left wheel. Four of the five rim clamps, studs and nuts had been removed when the side ring flew off, striking the employee in the head and chest. The victim was taken to the hospital, where he was pronounced dead.

Typical six spoke wheel on a bus.

Close-up of lug nut holding rim to wheel.

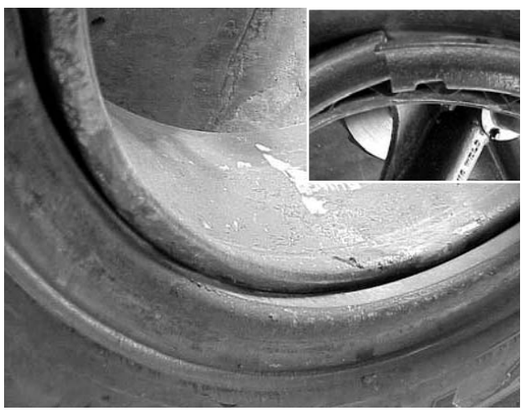
A multi-piece wheel has two or more parts. The side ring holds the tire and other components on the rim wheel by interlocking the components when the tire is inflated.

There are several variations of a multi-piece rim, including two-piece and three-piece assemblies. The rim pictured below is a tube-type demountable rim assembly with a split side ring typical of two-piece assemblies. The parts are designed to allow the split ring to fit snugly into the gutter on the rim and hold the tire on the wheel when the tire is inflated.



Close-up of rim at split.

The split side ring markings were illegible because the ring had been painted over with black paint four months earlier. When the paint was scraped off, the split side ring markings showed the ring was mismatched with the rim base and had been damaged when it was mounted previously or had been bent during the accident.



Inner wheel with tire mounted. ***Inset:*** *Close-up of split rim against mounted tire.*

The victim had been disassembling the wheel thinking that it had been put together according to the manufacturer's specifications. The employee had no reason to believe the mismatched split side ring and the rim base were not properly seated. The tire was properly inflated and had been driven for about four months before the incident.

Conclusion:

Mismatched multi-piece wheel components led to the catastrophic accident. OSHA standards clearly state that multi-piece components should not be interchanged except according to appropriate charts and the applicable rim manual. Other findings include:

- The split side ring was not completely seated and locked.
- Rim gutters and ring must be free of any surface rust that could obstruct seating of the ring.

Recommendations:

When working with multi-piece and single-piece rimmed wheels, **always** use a cage or barrier to protect the worker. There is no greater safety measure than a protective barrier for employees.

If the rim is painted or the markings otherwise illegible, the wheel and tire assembly should not be serviced.

Employees should be reminded regularly of the dangers of working around single-piece and multi-piece rim wheels. Employees must be extremely cautious when mounting and demounting rim wheels. Safety precautions should extend to other activities such as inflating, deflating, installation, removal and handling. In this particular accident, the employee had no plans of doing anything more than rotating the tires.

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